Trend Study 10R-11-00

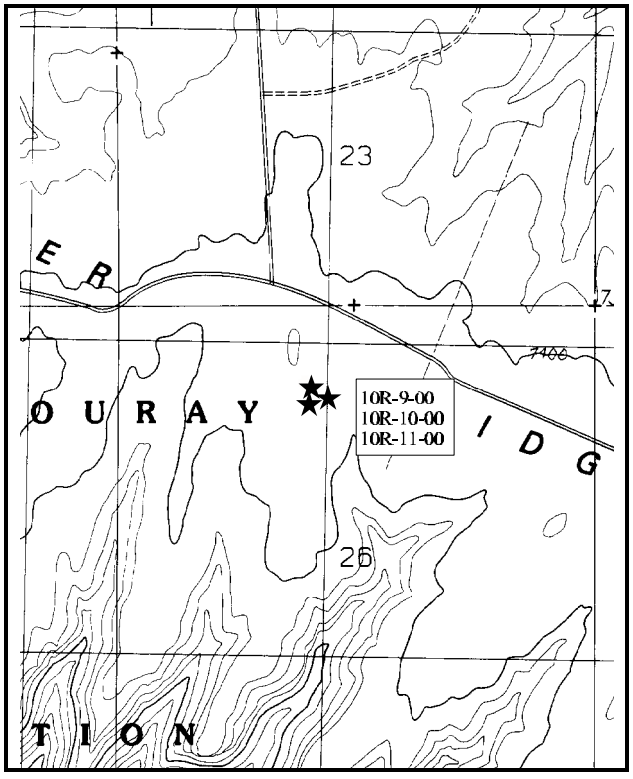
Study site name: Winter Ridge Total Exclosure . Range Type: Big Sagebrush

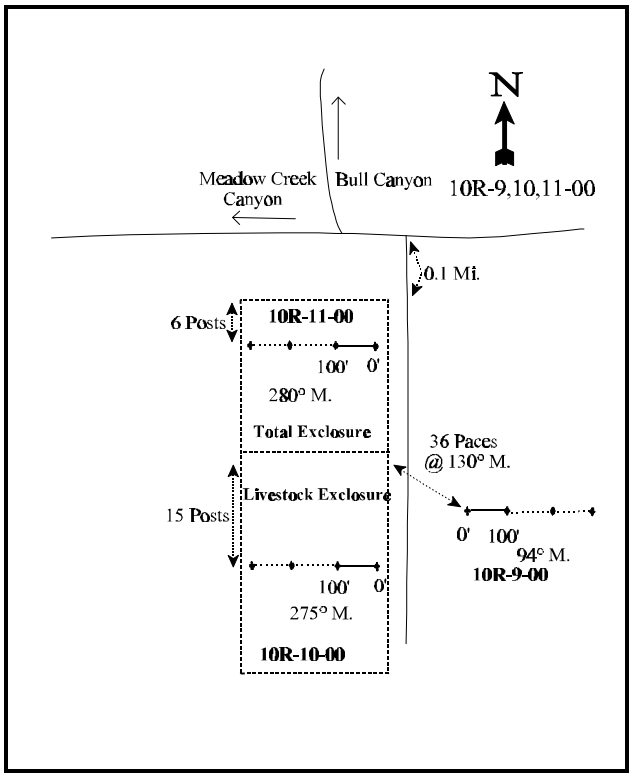
Compass bearing: Frequency baseline 280°M.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 71ft), line 2 (34 & 95ft), line 3 (59ft).

LOCATION DESCRIPTION

From the intersection where Meadow Creek Canyon and Bull Canyon meet, take the road to the south. Go 0.1 miles to the Winter Ridge Exclosure. From the northwest corner of the total exclosure, walk down six fenceposts. The 300-foot stake is just east of the sixth post. The 0-foot stake is on the east end and is marked by browse tag number 86.





Map name: Tenmile Canyon North

Diagrammatic Sketch

Township 15S , Range 21 E, Section 26

UTM. 4371942.223 N, 625694.757 E

DISCUSSION

Trend Study 10R-11

The Winter Ridge total exclosure study is found within the exclosure complex on Winter Ridge. The exclosure was constructed in 1964 and the trend study was established in 1997. The study samples the area of the total exclosure which excludes livestock and big game use. The site has a slope of 5% with a westerly aspect and an elevation of 7,200 feet.

Soil within the total exclosure is moderately deep with an effective rooting depth (see methods) estimated at nearly 18 inches. There is compacted layer at that depth. There is a slight soil depth gradient with more shallow soils near the west fence and deeper soils near the east end of the exclosure fence. It has a loam texture with a neutral soil reaction (7.2 pH). Phosphorus and potassium are low at 5.4 and 3.2 ppm respectively. Values less than 10 ppm for phosphorus and 70 ppm for potassium may limit normal plant growth and development. Cracks are apparent from the soil drying and shrinking. Percent bare ground is low with an estimated cover of 22% in 1997 and 15% in 2000. There is some pedestaling apparent around plants, but there is currently enough vegetation and litter cover to protect the soil.

Mountain big sagebrush is the dominant browse within the exclosure. It provides over 90% of shrub cover with an overly mature population of 7,460 plants/acre in 2000. There are few seedlings and young plants account for only 6% of the population. Mature plants are large and vigorous averaging 30 inches in height. Nearly one-quarter of the population was classified as decadent in 1997, increasing to 51% in 2000. There are few seed heads apparent from the last few growing seasons and leader growth is currently (‘00) poor averaging only 2 inches. The plants on the east side of the exclosure (deeper soils) appear to be in better vigor then the plants further west. Other browse species are scattered throughout the area, although none are very abundant. These include: winterfat, dwarf and stickyleaf low rabbitbrush, broom snakeweed, and cactus.

Grasses are abundant and vigorous with six species providing 36% cover in 2000. Mutton bluegrass dominates the composition by providing over half of the grass cover. Thickspike wheatgrass, blue grama, prairie Junegrass, and Sandberg bluegrass are also common. Forbs are fairly diverse but provide less than 10% of the total herbaceous cover. The only common forbs are desert phlox and scarlet globemallow.

1997 APPARENT TREND ASSESSMENT

The soil within the total exclosure shows little erosion but there are signs of past erosion events. Some of the plants are pedestaled, although it appears that this has not occurred recently. Vegetation, litter, and cryptogams protect the soil adequately to prevent runoff, except in severe cases. Mountain big sagebrush does not have residual seed heads and there are very few seedling or young plants present. Although percent decadency is not overly high at this time, the lack of seedlings and young should be monitored as there are probably not enough now to replace the dying plants. Grasses dominate the herbaceous understory, specifically muttongrass. Forbs are not very abundant, but Indian paintbrush appears at a higher density within the exclosure than outside.

2000 TREND ASSESSMENT

Trend for soil is up slightly due to a decline in percent bare ground, an increase in litter and vegetation cover, and an increase in herbaceous cover. Trend for the key browse, mountain big sagebrush, appears stable. Percent decadence increased from 24% to 51%, even though the number of plants classified as dying declined. The number of young plants appear abundant enough to replace those currently being lost. The proportion of sagebrush in poor vigor and the number of dead plants remains the same as before. It is apparent however, that the sagebrush are stressed from intraspecific competition (high densities) combined with drought. Trend for the

herbaceous understory is slightly up with an increase in the sum of nested frequency of perennial grasses being offset by losses to the forbs. Mutton bluegrass, the dominant species, increased significantly since 1997. Thickspike wheatgrass and Sandberg bluegrass also increased significantly. Sum of nested frequency of perennial forbs declined slightly but the most abundant species, desert phlox and scarlet globemallow, remained stable.

TREND ASSESSMENT
soil - slightly up (4)
browse - stable (3)
herbaceous understory - slightly up (4)

HERBACEOUS TRENDS --
Herd unit 10R, Study no: 11

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'97	'00	'97	'00	'97	'00
G	Agropyron dasystachyum	259	*287	84	89	1.82	4.11
G	Bouteloua gracilis	30	42	9	11	.95	2.17
G	Koeleria cristata	195	*114	64	44	4.24	3.57
G	Poa fendleriana	290	*352	87	93	10.91	24.99
G	Poa secunda	47	99	20	36	.54	1.23
G	Stipa comata	21	17	7	6	.16	.13
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		842	911	271	279	18.64	36.21
Total for Grasses		842	911	271	279	18.64	36.21
F	Antennaria rosea	18	*6	7	2	.08	.06
F	Arabis spp.	19	14	7	6	.11	.05
F	Astragalus convallarius	27	19	11	11	.19	.10
F	Castilleja linariaefolia	32	*6	19	2	.64	.01
F	Crepis acuminata	7	-	3	-	.16	-
F	Cryptantha spp.	4	-	2	-	.01	-
F	Erigeron eatonii	5	15	3	7	.01	.03
F	Lesquerella spp.	-	3	-	1	-	.00
F	Lygodesmia grandiflora	8	3	3	1	.04	.00
F	Penstemon caespitosus	8	3	2	1	.30	.03
F	Phlox austromontana	125	119	45	43	1.69	3.45
F	Phlox longifolia	54	*14	22	6	.14	.03
F	Sphaeralcea coccinea	52	58	24	25	.44	.35
F	Unknown forb-annual (a)	-	4	-	1	-	.15

Type	Species	Nested Frequency '97	Nested Frequency '00	Quadrat Frequency '97	Quadrat Frequency '00	Average Cover % '97	Average Cover % '00
Total for Annual Forbs		0	4	0	1	0	0.15
Total for Perennial Forbs		359	260	148	105	3.83	4.14
Total for Forbs		359	264	148	106	3.83	4.29

* Indicates significant difference at % = 0.10

BROWSE TRENDS --
Herd unit 10R, Study no: 11

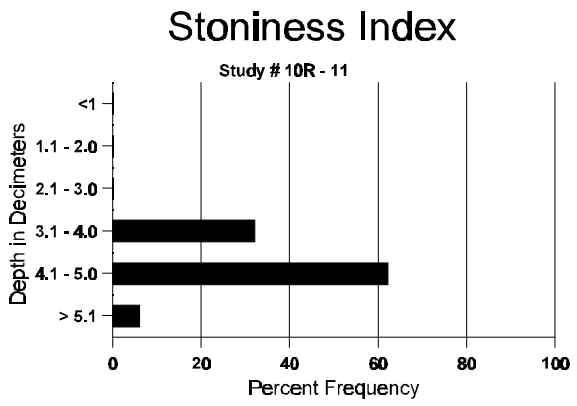
Type	Species	Strip Frequency '97	Strip Frequency '00	Average Cover % '97	Average Cover % '00
B	Artemisia tridentata vaseyana	96	97	19.43	20.13
B	Ceratoides lanata	5	6	.15	.03
B	Chrysothamnus depressus	3	1	.03	.00
B	Chrysothamnus viscidiflorus viscidiflorus	6	6	.45	.33
B	Gutierrezia sarothrae	6	30	.06	.61
B	Juniperus osteosperma	0	0	-	.00
B	Pediocactus simpsonii	5	11	.11	.16
B	Pinus edulis	0	2	-	.03
Total for Browse		121	153	20.25	21.31

BASIC COVER --
Herd unit 10R, Study no: 11

Cover Type	Nested Frequency '97	Nested Frequency '00	Average Cover % '97	Average Cover % '00
Vegetation	434	447	40.81	58.45
Rock	10	4	.07	.06
Pavement	71	39	.19	.15
Litter	498	459	33.62	42.13
Cryptogams	334	322	13.07	20.97
Bare Ground	328	289	21.73	15.06

SOIL ANALYSIS DATA --
Herd Unit 10R, Study no: 11

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
17.7	59.0 (16.5)	7.2	35.6	38.8	25.6	1.44	5.41	3.2	0.45



PELLET GROUP FREQUENCY --
Herd unit 10R, Study no: 11

Type	Quadrat Frequency '97	'00
Rabbit	5	3
Sage Grouse	-	2

BROWSE CHARACTERISTICS --
Herd unit 10R, Study no: 11

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata vaseyana																		
S	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
Y	97	17	-	-	-	-	-	-	-	-	17	-	-	-	340			17
	00	21	-	-	2	-	-	-	-	-	23	-	-	-	460			23
M	97	201	-	-	-	-	-	-	-	-	201	-	-	-	4020	28	35	201
	00	101	2	-	55	-	-	-	-	-	142	-	16	-	3160	30	31	158
D	97	67	2	-	-	-	-	-	-	-	37	-	-	32	1380			69
	00	73	-	-	116	-	-	3	-	-	167	-	2	23	3840			192
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	1520			76
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	1520			76

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'97	.69%	00%	11%	+23%
'00	.53%	00%	11%	

Total Plants/Acre (excluding Dead & Seedlings)			Dec:	
	'97	5740		24%
	'00	7460		51%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Ceratoides lanata																		
M	97	8	-	-	-	-	-	-	-	-	8	-	-	-	160	14	13	8
	00	8	-	-	1	-	-	-	-	-	9	-	-	-	180	17	11	9
D	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'97	00%	00%	00%	+20%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'97	160	Dec:		0%
'00	200			10%

Chrysothamnus depressus																		
Y	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	97	3	-	-	-	-	-	-	-	-	3	-	-	-	60	5	9	3
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'97	00%	00%	00%	-67%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'97	60	Dec:		-
'00	20			-

Chrysothamnus viscidiflorus viscidiflorus																		
S	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	97	10	-	-	2	-	-	-	-	-	12	-	-	-	240	14	16	12
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40	16	19	2
D	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	6	-	-	-	-	-	-	-	-	5	-	-	1	120			6
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'97	00%	00%	00%	-21%
'00	00%	00%	09%	

Total Plants/Acre (excluding Dead & Seedlings)				
'97	280	Dec:		7%
'00	220			55%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
S	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Y	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	47	-	-	-	-	-	2	-	-	49	-	-	-	980			49
M	97	10	-	-	-	-	-	-	-	-	10	-	-	-	200	5	5	10
	00	171	-	-	-	-	-	-	-	-	171	-	-	-	3420	4	6	171
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'97	00%	00%	00%	+95%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'97	200	Dec:		-
'00	4400			-

Juniperus osteosperma																		
S	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'97	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'97	0	Dec:		-
'00	0			-

Pediocactus simpsonii																		
Y	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	1	-	-	2	-	-	-	40			2
M	97	5	-	-	-	-	-	-	-	-	5	-	-	-	100	3	4	5
	00	6	-	-	-	-	-	3	-	-	9	-	-	-	180	2	3	9
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'97	00%	00%	00%	+55%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'97	100	Dec:		-
'00	220			-

Pinus edulis																		
Y	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	1	-	-	-	-	-	2	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'97	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'97	0	Dec:		-
'00	40			-

WINTER RIDGE EXCLOSURE COMPARISON SUMMARY

Trend Study No. 10R-9 (outside), 10R-10 (livestock), and 10R-11 (total)

Ground cover characteristics are similar between the livestock exclosure and outside of the exclosure where percent bare ground is relatively high at around 30%, yet litter and vegetation cover are abundant and appear adequate to protect the soil. Inside the total exclosure, herbaceous cover is more abundant and percent bare ground significantly lower at only 15%.

The key browse for this study area is mountain big sagebrush. It shows moderate to heavy use outside of the exclosure which is expressed in sagebrush that are shorter in height by an average of 10 inches. Nearly half of the plants sampled were classified as decadent and a third of those were classified as dying (1,580 plants/acre). Seedlings are rare and young plants account for 8% of the population which is currently not enough to replace decadent/dying plants. Sagebrush in the livestock exclosure are taller, mostly light to moderate hedging, but show some similarities in trend to those outside of the exclosure. They have a moderate decadency rate of 23%, but 67% (720 plants/acre) were classified as dying. Reproduction is marginal with no seedlings sampled in 2000 and young plants accounting for 11% of the population (540 plants/acre). Under current conditions, this would not be enough to replace the decadent/dying plants. Even though the sagebrush in the total exclosure show no use, they have a high rate of decadence at 51%. Twelve percent of the decadent shrubs sampled were classified as dying. Seedlings are rare but young plants are abundant enough to replace decadent and dying plants. Taking all of this into consideration, the sagebrush on these sites appear to be suffering the effects of drought combined with intra and interspecific competition. The populations may decline slightly in the future, but a return to normal precipitation patterns will improve conditions.

The herbaceous understories are relatively abundant and diverse on all treatment effects with perennial grasses dominating the herbaceous understory. The most common species include: thickspike, blue grama, prairie Junegrass, mutton and Sandberg bluegrass. The biggest difference between the three site treatment effects is the abundance of mutton bluegrass in the total exclosure. It provides 69% of the grass cover in the total exclosure with a cover value nearly 4 times more than outside of the exclosure and 7 times more than the livestock exclosure. Forbs are diverse on all sites yet they provide only 27% of the total herbaceous cover outside of the exclosure, 10% in the livestock exclosure, and 11% in the total exclosure. The most common forb for all sites is desert phlox.

It is difficult much of the time to determine which of many factors may be the most influential in effecting the trend for a key species. Here we have a relatively high elevation three-way exclosure where transects were established in 1997 and read again in 2000. With only two data points, trends are not well developed, but in 2005 when it is read again, that data should give a better determination of long-range trends for mountain big sagebrush. With the data that is available now, numbers of young in the population vs the numbers of plants that are classified as dying is most important and meaningful in explaining trends. These data shows that on the outside, the young will only replace about 49% of the dying individuals; on the livestock exclosure, the young will only replace 71% of dying individuals within this treatment; and within the total exclosure the young will replace 98% of the dying individuals. One should use caution in interpreting these data because it is only two readings which occurred within three years. Drought currently appears to be the most influential factor effecting trend at this site, coupled with use.

2000 Trend Data Comparisons

	Outside Exclosure	Livestock Exclosure	Total Exclosure
Big sagebrush			
Average Cover	19.2	14.8	20.1
Density (plants/acre)	9,760	4,720	7,460
% young	8% (781/acre)	11% (519/acre)	6% (448/acre)
% decadent	49% (4,782/acre)	23% (1,086/acre)	51% (3,805/acre)
% decadent/ dying	33% (1,578/acre)	67% (728/acre)	12% (457/acre)
% poor vigor	17% (1,659/acre)	23% (1,086/acre)	11% (821/acre)
% heavy use	36% (3,514/acre)	7% (330/acre)	0% (0/acre)
Average height/crown	20/23	30/33	30/31